

Reducing stress in the workplace

An evidence review: full report

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Contents

Executive summary	4
1. Introduction	11
2. Stress in the workplace: a current snapshot	12
3. The impacts of workplace stress	14
4. The benefits of reducing workplace stress	22
5. Population groups most at risk.....	26
6. Best practice workplace interventions and strategies at organisational and systems levels	29
7. Conclusions	39
8. Appendixes.....	40
9. References.....	43

Executive summary

Job stress is a large and growing concern in Australia and internationally. This report presents a current snapshot on job stress concepts and measures, an overview of the evidence linking job stress to ill health, estimates of the size of the problem, the benefits of reducing job stress, a summary of the intervention research on ways to prevent and control job stress, an outline of international best practice in job stress intervention and resources for workplace stakeholders to support efforts to implement best practice.

Stress in the workplace: a current snapshot

The term 'job stress' refers to distress resulting from a situation where the demands of a job are not matched by the resources provided to get the job done. Either or both sides of this equation can be modified to prevent or reduce job stress – modifying demands or stressors and improving job resources. Resources might include a worker's occupational skills, job experience or education, or organisational resources such as machinery, raw materials, or staffing levels available to produce goods or provide services. Job stressors are working conditions that increase the risk of job stress and consequent impacts on health.

There are numerous job stress terms, concepts, models and theories, all of which can be understood in the context of the job stress *process*. The process initiates with exposure to *stressors*. Stressors arising from the work environment are classified as psychosocial or physical. Psychosocial stressors (also referred to as psychosocial working conditions) include job demands, job control, job insecurity, bullying, harassment and more. Physical stressors include noise and ergonomic exposures (such as awkward working postures and repetitive movements).

Exposure to stressors can lead to perceived *distress* (strictly speaking, job stress is short for job-related *distress*). Perceived distress can in turn lead to adverse *short-term responses*, which can be physiological (e.g. elevated blood pressure), psychological (e.g. tenseness) or behavioural (e.g. smoking or alcohol consumption as forms of coping). Distress, as well as short-term responses, increase the risk of *enduring health outcomes* of a physiological (e.g. coronary heart disease), psychological (e.g. anxiety disorder) or behavioural (e.g. nicotine addiction, alcoholism) nature. Importantly, job stress can affect health both directly – through neuroendocrine mechanisms and indirectly – through health behavioural pathways.

There are three theoretical frameworks, or models, for measuring psychosocial and physical stressors that have been most widely validated and utilised in epidemiological studies of job stress and health. Karasek and Theorell's demand/control model (DCM) is the most widely studied. It postulates that job stress arises from the interaction of low control with high demands which, according to the model

produces 'job strain'. Importantly, this model also articulates how work can be health-promoting for workers in jobs with both high demand and high job control (so-called 'active jobs'). Active jobs are both challenging and rewarding.

The health, social and economic impacts of workplace stress

The link between workplace stress and adverse effects on physical and mental health has been well-substantiated in a large body of international research. Cardiovascular disease (CVD) is the most widely studied physical health outcome. Numerous cross-sectional studies have linked job stress with physiological risk factors for CVD (e.g. hypertension, atherogenic lipids, elevated fibrinogen, overweight/body mass index) and with CVD outcomes (e.g. myocardial infarction, coronary heart disease). Job strain was shown to predict subsequent CVD outcomes after controlling for established CVD risk factors (e.g. smoking, overweight) in more than a dozen prospective cohort studies, including the widely known Whitehall I & II studies. In addition, there is growing evidence that job stress increases the risk of metabolic syndrome and diabetes; this would likely occur through a combination of direct neuroendocrine mechanisms as well as through health behavioural pathways (e.g. low physical activity, poor diet, alcohol consumption).

Various measures of job stress, most commonly the demand-control model, have been linked cross-sectionally and prospectively to mental health outcomes ranging from increased visits for psychiatric treatment to psychological distress, general mental health, depressive symptoms, major depression, anxiety and suicide. There is a growing number of longitudinal or prospective studies in which measurement of job stressors preceded the development of mental disorders, thus strengthening the confidence with which we can conclude that the increased risk observed is attributable to job stress and not other factors. A 2006 meta-analysis assessed relationships between common mental disorders and various demand-control model measures (job control, job demands, job strain and social support at work) finding in summary robust and consistent evidence that high demands, low control and the combination of the two [job strain] are prospective risks factors for common mental disorders.

As well as acting directly through sustained autonomic nervous system activation leading to adverse health impacts, job stress can also harm health indirectly by fostering a range of behaviours which negatively impact on health: cigarette smoking, higher body weight, poor diet, lack of exercise and alcohol abuse. The overall evidence is mixed, but appears strongest for heavy alcohol consumption among men, overweight and the co-occurrence of multiple risky health behaviours.

Job stress has also been linked to a range of adverse impacts on organisations. Job stress reduces productivity through increased turnover, absenteeism and 'presenteeism'. Other organisational outcomes linked to job stress include poorer organisational citizenship behaviours, greater

counterproductive work behaviours, higher accident and injury rates and higher health care expenditures and workers' compensation premiums. Job stress-related organisational outcomes and their associated costs to business represent potential levers for convincing employers and their organisations to expand job stress prevention and control efforts, as detailed further below.

Because exposure to job stressors is widespread across the entire working population (e.g. approximately 25 per cent of working women and approximately 18 per cent of working men are exposed to job strain across the OECD) and because job stress increases the risk of common chronic disease outcomes, job stress-attributable illness burdens are large. Internationally, CVD attributable to job strain was estimated at 7–16 per cent among men for job strain assessed at a single point and up to 35 per cent for long-term exposure to low job control.

In a Victorian study, we estimated prevalence of job strain-attributable depression at 13.2 per cent among working men and 17.2 per cent among working women. A recent New Zealand birth cohort study found that 45 per cent of incident cases of depression and anxiety among young workers were attributable to job stress. These and other estimates suggest that a substantial, and preventable, fraction of common chronic diseases among working Australians is attributable to job strain. Furthermore, these estimates are likely to be conservative in that only two job stressors (control and demand) were accounted for whereas other stressors also contribute to physical and mental health risks (such as job insecurity, bullying and other forms of harassment).

The health, social and economic benefits of addressing workplace stress

Two key points are essential to making a case for the benefits of addressing job stress:

1. Job stress is preventable, as demonstrated in a large and growing body of intervention research.
2. Reducing or eliminating job stress could substantially improve population mental and physical health (reversing the health impacts and burdens described in the previous section).

Economic costs can be estimated for some of these health and social benefits, providing an indication of the economic benefits of reducing or eliminating job stress. These points are addressed in turn below.

The international job stress intervention research literature has been the subject of a number of recent systematic reviews. The most comprehensive of these reviews (summarising 90 intervention studies) focused on interventions in which organisations set out to address job stress proactively. This review concluded that individual-focused, low-systems approaches (e.g. coping and time management skill development) are effective at the individual level, favourably affecting individual-level outcomes such as health and health behaviours.

Individual level interventions, however, tend not to have favourable impacts at the organisational level (e.g. reducing exposures, sickness absence). Organisationally focused high- and moderate-rated approaches (addressing working conditions) are beneficial at both individual and organisational levels. Two subsequently published Cochrane reviews reached similar conclusions. Taken together, these findings provide strong supporting evidence for growing efforts nationally and internationally to address the upstream determinants of job stress (working conditions) as well as its downstream health and other consequences.

Using the Victorian estimates for job strain-attributable depression described above, we recently estimated the economic benefits of reducing or eliminating job strain-attributable depression using epidemiologic and economic modelling. Societal cost of lifetime depression in the workforce (all depression, regardless of cause) was estimated at \$12.6 billion over one year and \$213.5 billion over a lifetime. The vast majority of these costs related to employment (lost productive time and job turnover).

The societal cost of depression in employed Australians *that is attributable to job strain* was estimated at \$730 million over one year and \$11.8 billion over a lifetime. This provides an upper bound for the potential economic benefits if job strain could be reduced at a population level. Findings indicate that the vast majority of employment-related costs from depression in the workforce are borne by employers. This provides a clear business incentive for employers to invest in initiatives that reduce job stress, promote mental health and encourage help-seeking, as the return on investment is potentially in the tens of millions of dollars.

The identification and documentation of best practice workplace interventions and strategies at organisational and systems levels

Job stress can be prevented and controlled effectively using a systems approach that integrates *primary, secondary and tertiary intervention*. In brief, *primary preventive interventions are proactive*; aiming to prevent the occurrence of illness among healthy individuals. These target sources of stress in the workplace, or stressors, through changes in the work environment or the organisation. Examples include changes in work pacing and job redesign and the formation of joint labour/management health and safety committees.

Secondary interventions are ameliorative; aiming to modify an individual's response to stressors, targeting the individual. Examples of secondary prevention interventions include stress management classes to help employees to either modify or control their appraisal of stressful situations, such as the development of muscle relaxation or meditation skills. Finally, *tertiary interventions are reactive*; aiming to minimise the effects of stress-related problems once they have occurred, through 'treatment' or

management of symptoms or disease. These include efforts to help employees cope more effectively with reactions to stressful conditions, counselling (such as employee assistance programs) and return-to-work and other rehabilitation programs.

The development and implementation of job stress interventions must include the meaningful *participation* of groups targeted by intervention. Participation is a particularly important principle in job stress intervention because it is integral to the prevention and control of job stress itself. Participation is a concrete enactment of job control, demonstrates organisational fairness and justice, and builds mutual support among workers and between workers and supervisors (recall these constructs from the section above on job stress and its health impacts). These and other aspects of participation constitute primary preventive interventions in the job stress process.

Participation also helps to optimise the fit of the intervention to the context at hand and provides a means for integrating the participant's context expertise with the content expertise of OHS (Occupational Health and Safety) or other professionals involved in the intervention. This is crucial because organisations usually require unique solutions to job stress problems, even if the process of intervention may be based on generic principles and frameworks. More traditional and complementary means of tailoring an intervention to context include needs assessment or risk assessment. Specific examples of intervention activities corresponding to primary, secondary and tertiary intervention are provided. Well-developed sets of indicators, available from international sources, are also described.

The consolidation of the evidence base around best practice for job stress and other workplace interventions has been the subject of considerable attention in Europe and the UK, as well as at the World Health Organization (WHO). A recent multi-country project called Psychosocial Risk Management-Excellence Framework (PRIMA-EF) was conducted to provide a comprehensive best practice framework for psychosocial risk management in the workplace to a range of stakeholders including policy-makers, employers, trade unions, OHS professionals and employees. In a series of interviews and focus groups conducted by the PRIMA-EF project, features of successful workplace intervention projects were identified. The seven key features provide a useful organising framework for best practice tools and resources for workplace stress intervention.

In the body of the report, resources are detailed for each of these intervention features to assist workplaces in understanding and achieving best practice:

1. Workplace interventions need to be developed with a full understanding of theory and evidence-based practice.
2. A systematic and step-wise approach needs to be utilised with development of clear aims, goals, tasks and intervention-planning.

3. A proper risk assessment needs to be carried out with the aim of identifying risk factors and groups of workers with potentially high exposure.
4. The interventions need to be tailored to suit a given industrial sector, occupation and workplace size, but also remain flexible and adaptable for implementation in a specific workplace.
5. The most effective interventions are those which are accessible and user-friendly in their format, process and content to individuals at all levels of an organisation (from lowest status workers to highest level managers).
6. A systematic approach was highlighted as the most effective, with components of the intervention aimed at both the individual and the organisation.
7. Intervention programs that facilitate competency building and skill development are important as at the organisational level they build leadership and management skills.

Identification of specific participants who are most vulnerable and at risk for workplace stress

Based on epidemiologic studies of exposures to job stressors in the Victorian working population and comparisons with patterns of workers' compensation claims, we identified worker groups at greatest risk of workplace stress and associated illness burdens. Findings indicate that priority groups for intervention include younger workers, working women, workers in lower skilled occupations and precariously employed workers. These groups are more highly represented in the service sector.

By comparison, workers' compensation statistics under-represent highly exposed groups in lower socioeconomic positions. These findings offer a public health evidence-based complement to workers' compensation insurance statistics for guiding policy and practice in this area. Improvements in working conditions for these groups would lead to the greatest population health benefits.

Conclusions

The substantial and inequitably-distributed job stress-related disease burden could be addressed by applying a systems approach to job stressors and other psychosocial working conditions. Despite the extensive evidence in support of systems approaches to job stress, prevalent practice in Victorian workplaces and internationally remains disproportionately focused on individual-level intervention with inadequate attention to the reduction of job stressors. In addition to being a concern for workers, unions, employers, occupational health and safety and workers' compensation systems, job stress should be a concern for physical and mental health promotion agencies, government public health authorities,

medical practitioners, community advocacy groups and others. An optimal public health response to job stress would encompass participation by the full range of stakeholders.

1. Introduction

Work can be defined as the application of mental or physical effort to a particular purpose. At any point in time, roughly two-thirds of working age Australians are working for profit or pay. More still will be performing unpaid work, such as caring for children or dependant relatives, or performing other duties such as housework. Work is a central determinant of health and health inequalities, with the potential both to promote and to harm health through a wide variety of pathways (LaMontagne & Keegel, 2009; WHO, 2003).

Economic participation was identified by the Victorian Health Promotion Foundation (VicHealth) as a key determinant of mental and physical health (Moodie & Verins, 2002). Economic participation is health-promoting in various ways, most obviously as a source of income; paid employment is a primary determinant of adult socioeconomic position. It can also play important positive roles in adult socialisation and the development of identity and self-esteem, extending possibilities for social connectedness through participation in social networks outside family and neighbourhood groups.

The field of occupational health and safety (OHS) is dedicated to recognising and preventing work-related disease and injury (LaMontagne & Keegel, 2009). Historically, OHS focused more on injury than disease and more on blue-collar or manual occupations than others. More recently, the psychosocial work environment is emerging as the leading contributor to occupational disease. The psychosocial work environment is potentially of concern for all working people and comprises a number of job stressors such as 'job control' and 'job demands' (as detailed further).

More recently recognised stressors include workplace bullying, discrimination in the workplace and sexual harassment. Upstream determinants of psychosocial working conditions include the state of the economy and the contractual arrangements under which workers are employed (Benach et al., 2007; Quinlan & Bohle, 2009), with many recent studies looking at contingent work or precarious employment and its relationship with working conditions and health (Benach & Muntaner, 2007; Cranford et al., 2003; LaMontagne et al., 2009; Quinlan et al., 2001; Tompa et al., 2007). Despite the many beneficial health effects of work, jobs with poor psychosocial quality can be more harmful to health than being unemployed, as a recent Australian study has demonstrated (Broom et al., 2006).

2. Stress in the workplace: a current snapshot

What is job stress? Job stress concepts and measures

There are numerous job stress terms, concepts, models and theories, all of which can be understood in the context of the job stress *process*, as outlined in Figure 1 (see end of document). The various job stress models and theories all propose that the stress process originates with exposure to *stressors* (Huang et al., 2002; Israel et al., 1996). Stressors arising from the work environment are classified as psychosocial or physical. Psychosocial stressors (also referred to as psychosocial working conditions) include job demands, job control, job insecurity, bullying, harassment and more. Physical stressors include noise and ergonomic exposures (such as awkward working postures and repetitive movements).

As depicted in Figure 1, exposure to stressors can lead to perceived *distress* (strictly speaking, job stress is short for job-related *distress*). Perceived distress can in turn, lead to adverse *short-term responses*, which can be physiological (e.g. elevated blood pressure), psychological (e.g. tenseness) or behavioural (e.g. smoking or alcohol consumption as forms of coping). Distress as well as short-term responses increase the risk of *enduring health outcomes* of a physiological (e.g. coronary heart disease), psychological (e.g. anxiety disorder) or behavioural (e.g. nicotine addiction, alcoholism) nature. Importantly, job stress can affect health both directly, through neuroendocrine mechanisms, and indirectly, through health behavioural pathways (Chandola et al., 2008).

Each of these steps in the stress process can be affected by a wide range of modifying factors (social, psychological, biophysical, behavioural and genetic). In addition, the process is not simply linear, as feedback may occur between different steps (e.g. enduring health outcomes may lead to increased vulnerability to continuing job stressors). Physical and psychosocial stressors can interact to increase vulnerability to enduring health effects of job stress (Lindstrom & Mantysalo, 1987). Notable examples in this regard are noise (Blomkvist et al., 2005) and ergonomic exposures (Huang et al., 2002). Finally, recent evidence suggests that the effects of job stress on enduring health outcomes may be greater among lower socioeconomic or occupational status groups (Ibrahim et al., 2009; Landsbergis et al., 2003; Landsbergis et al., 1999; Wege et al., 2008).

The US National Institute for Occupational Safety & Health defines job stress as “the harmful physical and emotional responses that occur when the requirements of the job do not match the capabilities, resources, or needs of the worker. Job stress can lead to poor health and even injury” (NIOSH, 1999). Job stress refers to distress resulting from a situation where the demands of a job are not matched by the resources provided to get the job done. Either or both sides of this equation can be modified to prevent or reduce job stress – modifying demands or stressors and improving job resources. Resources might include a worker’s occupational skills, job experience, education or organisational resources such as

machinery, raw materials or staffing levels available to produce goods or provide services. Job stressors are working conditions that increase the risk of job stress and consequent impacts on health, as detailed below.

There are three theoretical frameworks, or models, for measuring psychosocial and physical stressors that were most widely validated and utilised in epidemiological studies of job stress and health. These models mainly focus on measuring psychosocial stressors present at the task or organisational level in the work environment.

Karasek and Theorell's demand/control model (DCM) is the most widely studied (Karasek & Theorell, 1990). The DCM focuses on task-level job characteristics. It postulates that perceived stress among workers arises from the interaction of low control with high demands which, according to the model, produces 'job strain'. Further, the model postulates that low levels of support from co-workers and supervisors, in conjunction with low control and high demand (i.e. a work environment condition named 'iso-strain') is particularly hazardous (Johnson & Hall, 1988). Importantly, this model also articulates how work can be health-promoting for workers in jobs with both high demand and high job control (so-called 'active jobs'). Active jobs are both challenging and rewarding.

Other models include Siegrist's Effort-Reward Imbalance (ERI), which focuses on the reciprocity of exchange at work where high cost/low gain conditions (i.e. high effort and low reward, so-called 'effort/reward imbalance') are considered particularly stressful (Siegrist, 1996). Rewards include financial, self-esteem and occupational status control (e.g. job stability, ability to advance in one's career).

More recently, measures of organisational justice or equity were suggested as an organisationally-focused complement to the more task- or job-focused DCM and ERI models (Kivimaki et al., 2003a). Organisational justice includes procedural and relational components. Procedural justice refers generally to the perceived fairness or equity of decision-making within the organisation. Relational justice assesses the degree of perceived fairness and respect accorded to an individual by his or her supervisor. A Finnish research group led by Kivimaki has demonstrated, in a series of studies, that low perceived justice is harmful to worker health (Kivimaki et al., 2003a; 2003b; 2004).

Job stress refers to distress resulting from a situation where the demands of a job are not matched by the resources provided to get the job done.

3. The impacts of workplace stress

The link between workplace stress and adverse effects on physical and mental health has been well-substantiated in a rapidly growing body of international research (see Table 1, end of document). There is also a smaller, but growing, body of literature on the impacts of job stress and poor psychosocial working conditions on organisations. These are set out in turn below.

Job stress and physical health

In terms of physical health outcomes, cardiovascular disease (CVD) has been studied to the greatest extent (Belkic et al., 2004). Numerous cross-sectional studies have linked occupational stress with physiological risk factors for CVD (e.g. hypertension, atherogenic lipids, elevated fibrinogen, overweight/body mass index) and with CVD outcomes (e.g. myocardial infarction, angina pectoris, doctor-diagnosed coronary heart disease) (Belkic et al., 2004; Landsbergis, 2003b; Peter & Siegrist, 2000; Schnall et al., 2000). In addition, job strain and effort-reward imbalance were shown to predict subsequent CVD outcomes after controlling for established CVD risk factors (e.g. smoking, overweight, etc.) in more than a dozen prospective cohort studies, including the Whitehall I & II studies (Bosma, Peter, Siegrist, & Marmot, 1998; Kivimaki et al., 2002; Kuper & Marmot, 2003; Kuper et al., 2002; Peter & Siegrist, 2000; Schnall et al., 2000; Siegrist et al., 1990).

For example, a prospective cohort study found a doubling of CVD risk among industrial employees in high stress jobs as measured by either Karasek's demand/control or Siegrist's effort/reward imbalance models (Kivimaki et al., 2002). Using different measures, the multi-country 'InterHeart' case control study (N~25,000) found a doubling of risk for acute myocardial infarction from job stress as well as additional risk from non-work stress (Rosengren et al., 2004). This study included Australian subjects and found that risk patterns were consistent across regions, in different ethnic groups and in men and women.

In the most comprehensive systematic review of job stress and CVD to date, effect sizes for job strain as a risk factor for CVD ranged from a 1.2–4.0 fold increase for men and a 1.2–1.6 fold increase for women (after adjustment for other known CVD risk factors) (Belkic et al., 2004). Odds Ratios (OR) for effort/reward imbalance in relation to coronary heart disease ranged from 1.5–6.1 (Peter & Siegrist, 2000). The evidence base for men is larger and demonstrates strong and consistent evidence of association. The evidence base for women, on the other hand, is sparser and less consistent.

Adjusting for various personality traits (e.g. negative affectivity) and mental states (e.g. minor psychiatric disorder) has shown little effect on the relationship between job stress and CVD outcomes (Bosma, Stansfeld, & Marmot, 1998), with the possible exception of "overcommitment to work" (an ERI model

measure) substantially increasing job strain-associated risk in women (e.g. OR increasing from 1.2 to 2.2 in one study, reviewed by Belkic et al. (Belkic et al., 2004)).

In addition to the substantial contributions of job stress to hypertension, heart disease and cardio-deleterious behaviours, there is growing evidence that job stress also increases the risk of metabolic syndrome (Chandola et al., 2006) and diabetes (Heraclides et al., 2009; Kumari et al., 2004). As for CVD, this would likely occur through a combination of direct neuroendocrine mechanisms as well as through health behavioural pathways (e.g. low physical activity, poor diet, alcohol consumption).

Other physical health problems linked with job stress include musculoskeletal disorders, immune deficiency disorders and gastrointestinal disorders (Grosch & Sauter, 2005). Of particular note is the interaction between psychosocial and physical stressors in the production of illness. The risk of musculoskeletal disorders arising from ergonomic stressors is increased when a worker is exposed to poor psychosocial working conditions at the same time (Huang et al., 2002).

Job stress and mental health

The relationships between psychosocial working conditions and common mental disorders were extensively studied internationally (Bonde, 2008; Netterstrom et al., 2008; Stansfeld & Candy, 2006). Various measures of job stress, most commonly the demand-control model, were linked cross-sectionally and prospectively to mental health outcomes ranging from increased visits for psychiatric treatment to psychological distress, general mental health, depressive symptoms, major depression, anxiety and suicide (Niedhammer et al., 1998; Ostry et al., 2007; Stansfeld, Bosma et al., 1998; Stansfeld & Candy, 2006).

There is a growing number of longitudinal or prospective studies in which measurement of job stressors preceded the development of mental disorders. This strengthens the confidence with which we can conclude that the increased risk observed is attributable to job stress and not other factors (Bildt & Michelsen, 2002; Bourbonnais et al., 1998; Cheng et al., 2000; de Lange et al., 2002; de Lange et al., 2005; de Lange et al., 2004; Kawakami et al., 1997; Kawakami et al., 1992; Mino et al., 1999; Niedhammer et al., 1998; O'Campo et al., 2004; Parkes et al., 1994; Rugulies et al., 2006; Shields, 1999; Stansfeld et al., 1998; Stansfeld et al., 1997; Stansfeld et al., 1999).

A 2006 meta-analysis assessed relationships between common mental disorders and various demand-control model measures (job control, job demands, job strain and social support at work) finding in summary robust and consistent evidence that high demands, low control and the combination of the two [job strain] are prospective risks factors for common mental disorders (Stansfeld & Candy, 2006). A more broadly inclusive 2003 systematic literature review linked psychological ill health (including anxiety, depression and emotional exhaustion) and sickness absence to a range of job factors, including

management style, work overload and pressure, lack of control over work and unclear work role (Michie & Williams, 2003).

Job stress, depression and anxiety

Depression in the workplace and in the general population is of particular interest due to its high contribution to the general burden of disease, both in Australia and internationally (Matthers et al., 2000; WHO, 2001). Because depression is also the most studied mental health outcome in relation to job stress, we provide a more detailed review of the job stress and depression evidence in the Australian regional context. A more detailed review of the international evidence is provided in a separate recent publication (LaMontagne, Keegel et al., 2010).

The international literature includes a limited number of Australian studies. Two studies examined cross-sectional associations between job strain (demand-control model), job insecurity and mental health among 1,188 employed professionals in the ACT aged 40–44 years (D'Souza et al., 2003; Strazdins et al., 2004). After adjustment for a range of confounders and negative affectivity, they found statistically significant independent associations of job strain with depression (OR = 2.54) and anxiety (OR = 3.15). In the same models, job insecurity showed even stronger and significant independent associations (i.e. over and above the effect of job strain) with poor self-rated health (OR = 3.72), depression (OR = 3.49) and anxiety (OR = 3.29). Building on these findings, these investigators created a new measure called “job pressure” combining job strain with job insecurity, classifying individuals across a five-point gradient of low to extreme job pressure (Strazdins et al., 2004).

Job pressure showed a better fit with physical and mental health outcomes than job strain and job insecurity as separate independent variables (Strazdins et al., 2004). This graded measure of job pressure also demonstrated a dose-related increase in associated health outcome risks. Most notably, middle ranges of job pressure (in relation to low) showed associations with anxiety and depression comparable to job strain and job insecurity (adjusted ORs in range of 2–3), but a substantial increase in risk estimates with extreme job pressure for depression (adjusted OR = 13.88) and for anxiety (adjusted OR = 12.88).

A longitudinal New Zealand study reported a two-fold elevated risk of incident (i.e. first diagnosis) major depressive disorder or generalised anxiety disorder (combined into one outcome because they commonly occurred together in the same individual) amongst a birth cohort of 891 32-year-old workers who were exposed to high job demands (Melchior et al., 2007). Relative risks remained significant after adjustment for sociodemographics, negative affect and juvenile psychiatric disorders, with a RR of 1.90 for women and 2.00 for men.

Simultaneous exposure to high job demands, low job control and low social support at work showed significantly elevated relative risks of 2.10 for women and 6.32 for men. Notably, this was one of the first studies to rule out a history of psychiatric disorder before labour market entry as an explanation for the job stress-depression link. This study tested whether the association between job stressors and mental disorders in adulthood could be attributable to previous mental disorders in childhood, which in turn could influence the perception of work or selection into poor quality work. While this does happen to some extent, this study and another from the 1958 British Birth Cohort Study demonstrated that job stressors are an important source of preventable psychiatric diagnoses in midlife, even after accounting for childhood psychiatric disorders (Stansfeld et al., 2008).

A 2008 systematic review identified 16 follow-up studies which considered psychosocial factors at work and risk of major depression (Bonde, 2008). The review concluded that there were consistent findings that perceptions of adverse psychosocial factors in the workplace were associated with increased risk of subsequent depressive symptoms or major depressive episode. Another recent narrative review focusing specifically on depression found moderate evidence for a relation between the psychological demands of the job and the development of depression, with significantly elevated relative risks of approximately 2.0 (Netterstrom et al., 2008). In summary, the evidence linking job stressors and depression is quite strong, though further research is required to understand dose response (e.g. questions about exposure intensity, duration and timing in relation to depression) (LaMontagne, Keegel et al., 2010).

Job stress and health behaviours

As well as acting directly through sustained autonomic nervous system activation leading to adverse health impacts, job stress can also harm health indirectly by fostering a range of behaviours which negatively impact on health: cigarette smoking, higher body weight, poor diet, lack of exercise and alcohol abuse (Eakin, 1997; Siegrist & Rodel, 2006). The overall evidence is mixed, but appears strongest for heavy alcohol consumption among men, overweight and the co-occurrence of multiple risky health behaviours (Siegrist & Rodel, 2006).

A recent population-based Victorian (Australia) study found associations between job strain and smoking as well as long working hours (>50 hours/week) and higher body-mass index among working men (Ostry et al., 2006; Radi et al., 2007). Using a stronger study design, significantly elevated risks of alcohol dependence were reported in the Whitehall II occupational cohort for men exposed to effort-reward imbalance and for women exposed to low job control (Head et al., 2004). In contrast, a large Finnish study examined relationships between job strain, effort-reward imbalance and heavy drinking but found no consistent associations (Kouvonen et al., 2005).

The mixed findings of job stressor-health behaviour studies may be due in part to study population differences (i.e. homogeneous [e.g. occupational group, gender] versus heterogeneous [e.g. population-based]), as well as to other unmeasured influences on stressor-behaviour relationships. A recent US-based study, for example, showed that job stressor-smoking relationships were modified by workplace social capital: associations were buffered or attenuated in workplaces with high compared to low social capital (Sapp et al., 2010).

Though further study is indicated in this area, it is plausible that poor psychosocial working conditions are a contributor to addictive and deleterious health behaviours (Eakin, 1997). Nevertheless, some workplace health promotion authorities judge the evidence to be sufficient to justify action. The European Network for Workplace Health Promotion's 2002 Barcelona Declaration on Developing Good Workplace Health in Europe links the increase in mental disorders in Europe to increasing psychosocial stressors and strain in the workplace and declares that smoking and alcohol consumption are also work-related and "can only be tackled through health promoting workplaces" (ENWHP, 2002).

Job stress and organisational health

Job stress has been related to a range of adverse impacts on organisations. For example, a systematic literature review linked a number of psychosocial work factors (long hours worked, work overload and pressure and the effects of these on personal lives; lack of control over work; lack of participation in decision making; poor social support and unclear management and work role) to psychological ill health (including anxiety, depression and emotional exhaustion) and sickness absence (Michie & Williams, 2003).

Job stress reduces productivity through increased turnover, absenteeism and 'presenteeism'. Up to 40 per cent of turnover was attributed to stressors at work (Hoel et al., 2001). For example, effort-reward imbalance (Hasselhorn et al., 2004) and job strain (de Croon et al., 2004) were linked to higher employee turnover. A meta-analysis reviewing 175 studies that examined the relationship between stress at work and absenteeism concluded that stressors cause illnesses which then result in increased absenteeism (Darr, 2005). Absenteeism was seen as an adaptive coping response by reducing exposure to work stressors at times when the individual was most vulnerable to ill health. Some estimate as much as 60 per cent of absenteeism is attributable to stress-related disorders (Fletcher, 1988).

In a three-year Dutch longitudinal study, high job control predicted lower absence, but, unexpectedly, high demand was predictive of lower absence. High demand was suggested to operate in this instance as 'pressure to attend' (Smulders & Nijhuis, 1999), more recently referred to as 'presenteeism.'

Presenteeism refers to when individuals work while feeling unwell and is characterised by decreased quality and quantity of work and time at work not working on task. Presenteeism can be a response to job stressors and other poor working conditions.

Other organisational outcomes linked to job stress include poorer organisational citizenship behaviours, greater counterproductive work behaviours, higher accident and injury rates and higher health care expenditures and workers' compensation premiums (LaMontagne et al., 2006). Job stress-related organisational outcomes and their associated costs to business represent potential levers for convincing employers and their organisations to expand job stress prevention and control efforts, as detailed below.

How big is the problem? Estimating the job stress-attributable illness burden

Exposure to job stressors is widespread across the entire working population; approximately 25 per cent of working women and approximately 18 per cent of working men are exposed to job strain across the OECD (LaMontagne et al., 2008), and because job stress increases the risk of common chronic disease outcomes, job stress-attributable illness burdens are substantial. Estimates of the size and scale of a given exposure-related illness are useful for stimulating policy and practice initiatives to reduce exposure-related illness burdens. The proportion of a specific health outcome attributable to a given exposure or risk factor can be estimated if the population prevalence of exposure is known as well as how much the risk of the health outcome is increased by exposure (an epidemiologic technique known as population attributable risk [PAR]).

Most PAR estimates for job stress have examined demand-control model measures as exposures (Karasek, 1979) and CVD (cardiovascular disease) mortality outcomes. One study estimated the proportion of CVD attributable to job strain, the combination of low control and high demand, as 7–16 per cent among men for job strain assessed at a single point and up to 35 per cent for long-term exposure to low job control (Belkic et al., 2004; 2000). Another study from Finland used population-based exposure estimates for job strain of 19 per cent for men and 23 per cent for women and an OR of 2.0 for job strain in relation to fatalities caused by ischemic heart disease: this yielded PARs of 16 per cent of ischemic heart disease in men and 19 per cent in women (Nurminen & Karjalainen, 2001).

A US estimate assumed that 20 per cent of working men and women were exposed to low job control, with a combined rate ratio of 1.38 for low job control in relation to coronary heart disease, yielding a PAR of 7.1 per cent of coronary heart disease attributable to low job control (Steenland et al., 2003). Using job

strain exposure data from a Victorian working population survey combined with effect size estimates from the best-designed international studies, we estimated job strain-attributable risk for CVD among men of 22.9 per cent versus 9.3 per cent of CVD among women (LaMontagne et al., 2006). These various estimates suggest that a substantial – and preventable – fraction of CVD is attributable to job strain.

In contrast to CVD, few studies have been published for job stress-attributable mental disorders. Using the prevalence estimates for job strain of 19 per cent for men and 23 per cent for women in Finland, a 2001 study estimated that 14.6 per cent of “deaths related to depressive episodes” among men and 9.8 per cent among women were attributable to job strain (Nurminen & Karjalainen, 2001).

We are aware of only one study estimating job stress-attributable prevalent mental disorders. Using population-based exposure prevalence data from the Australian state of Victoria combined with an effect size estimate from a published meta-analysis of the best available international studies (Stansfeld & Candy, 2006), we estimated the proportion of prevalent cases of depression attributable to job strain (low control, high demand jobs) (LaMontagne et al., 2008). The meta-analysis estimated an (adjusted) OR of 1.81 (95 per cent CI 1.06, 3.10) for the prospective association of job strain with incident depression (Stansfeld & Candy, 2006). Job strain exposure prevalence, however, was significantly higher among women than men (25.5 per cent versus 18.6 per cent), leading to estimates of job strain-attributable depression of 13.2 per cent among working men and 17.2 per cent among working women (LaMontagne et al., 2008). In addition, because of higher job strain exposure prevalence among lower skilled and lower educated workers, this burden is disproportionately born by lower status workers, with roughly twice the job strain-attributable depression burden among the lowest skilled workers compared to highest.

A recent New Zealand birth cohort study found that 45 per cent of incident cases of depression and anxiety were attributable to job stress (Melchior et al., 2007). In contrast to most chronic diseases, mental disorders have their onset in youth and early adulthood (Kessler et al., 2005). This finding, combined with the PAR estimates above, suggests that psychosocial working conditions are a major contributor to common mental disorders, particularly in younger workers.

To produce a comprehensive estimate of the effects of job strain on mental health, other associated mental health outcomes would need to be included, such as anxiety, work-related suicide and behavioural disorders (for example, alcoholism and nicotine addiction) (Head et al., 2004; Ostry et al., 2007; Stansfeld & Candy, 2006). Further, job strain represents only one of several work-related psychosocial hazards. Others that were linked to depression include effort-reward imbalance, injustice at work, job insecurity and bullying (Kivimaki et al., 2003c; Stansfeld & Candy, 2006; Tsutsumi & Kawakami, 2004). All such hazards would need to be included to estimate the full effect of psychosocial work hazards on depression in particular and on mental health disorders in general.

Thus, we would argue that the impacts of *all* psychosocial working conditions on depression would be higher than the estimates we have presented and corresponding estimates for *all* affected mental health outcomes would be higher still. In short, the PAR estimates presented for both mental and physical health are conservative and will likely increase as more comprehensive estimates are generated in the future. These and other estimates suggest that a substantial – and preventable – fraction of common chronic diseases among working Australians is attributable to job strain. Job strain and associated CVD and depression risks represent a substantial, preventable and inequitably distributed public health problem.

4. The benefits of reducing workplace stress

Two key points are essential to making a case for the benefits of addressing job stress:

1. Job stress is preventable, as demonstrated in a large and growing body of intervention research.
2. Reducing or eliminating job stress could substantially improve population mental and physical health (reversing the health impacts and burdens described in the previous section).

Economic costs can be estimated for some of these health and social benefits, providing an indication of the economic benefits of reducing or eliminating job stress. These points are addressed in turn below.

Job stress intervention research

The international job stress intervention research literature has been the subject of a number of recent systematic reviews. The most comprehensive of these reviews (summarising 90 intervention studies) focused on interventions in which organisations set out to address job stress proactively (LaMontagne et al., 2007a). This review concluded that individually-focused, low-systems approaches (e.g. coping and time management skill development) are effective at the individual level, favourably affecting individual level outcomes such as health and health behaviours. Individual level interventions, however, tend not to have favourable impacts at the organisational level (e.g. reducing exposures, sickness absence). Organisationally-focused high- and moderate-rated approaches (addressing working conditions) are beneficial at both individual and organisational levels.

The four main conclusions from this review (LaMontagne et al., 2007a) were:

- Conclusion 1:** Studies of interventions using high systems approaches represent a growing proportion of the job stress intervention evaluation literature, possibly reflecting the increasing application of such approaches in practice internationally.
- Conclusion 2:** Individually-focused, low systems approaches are effective at the individual level, favourably affecting a range of individual level outcomes.
- Conclusion 3:** Individually-focused, low systems approach job stress interventions tend not to have favourable impacts at the organisational level.
- Conclusion 4:** Organisationally-focused high and moderate systems approach job stress interventions have favourable impacts at both individual and organisational levels.

Two Cochrane reviews were published soon after the previously described review (Bambra et al., 2007; Egan et al., 2007). While these had more strict inclusion criteria (to improve the confidence with which the reviewers can conclude that the observed changes are attributable to the intervention and not some other factor), they also included natural experiments, or unintended changes in stressors, such as from downsizing and restructuring. Natural experiments were excluded from the systematic review.

The first Cochrane review of organisational level interventions to increase job control found some evidence of health benefits (e.g. reductions in anxiety and depression) when employee control increased or (less consistently) when demands decreased or support increased (Egan et al., 2007). They also found evidence of worsening employee health from downsizing and restructuring (Egan et al., 2007). The second Cochrane review of task restructuring interventions (Bambra et al., 2007) found that interventions that increased control resulted in improved health.

An overarching 'umbrella' summary of systematic reviews of the effects on health and health inequalities of organisation changes to the psychosocial work environment was published in 2009 by the Cochrane Public Health Review Group in the UK (Bambra et al., 2009). In addition to including the Cochrane reviews, shift work, work scheduling, privatisation and restructuring were considered. Findings suggested that organisational level changes to improve psychosocial working conditions can have important and beneficial effects on health.

The authors also assessed the potential for such interventions to impact on health inequalities. Though there was limited evidence in this regard, findings tentatively suggest that organisational level interventions on the psychosocial work environment may also have the potential to reduce health inequalities. The authors recommended that policy-makers should consider organisational level workplace interventions when seeking to improve the health of the working age population.

Taken together, these recent systematic reviews demonstrate that effective strategies for the prevention and control of job stress are available. In summary, we conclude that systems or comprehensive approaches to job stress are more effective than other alternatives and that benefits accrue to individuals (e.g. better health) and to organisations (e.g. lower absenteeism).

In addition to studies in which researchers assign different groups of workers or organisations to different types of interventions (as was the case for most of the studies in the systematic reviews), intervention research can also be conducted by capturing 'natural experiments' in longitudinal studies. In this context, a 'natural experiment' is when changes in psychosocial working conditions happen for some workers over time but not for others. One can then investigate whether the changes in job stressors predict corresponding changes in health. There are relatively few of these studies, but they provide an important complement to traditional intervention studies.

For example, a Dutch study found that when job strain and mental health were examined over four consecutive one year intervals, only changing from low to high job strain was associated with an increase in depressive symptoms (de Lange et al., 2002). In the UK Whitehall II study, investigators found that adverse changes in job demands and job control led to higher risks of psychiatric disorders, but that improvements in demands and control had no effect (Stansfeld et al., 1999). A recent study examined changes in job strain in relation to the risk of major depression in the Canadian National Population Health Survey (Wang et al., 2009), finding elevated risks for those in high strain jobs at both time points as well as those moving from low to high strain jobs (compared to those in low strain jobs at both time points as the reference category and after adjustment for age, education, previous history of depression, perceived health status and childhood trauma). These studies generally support a causal relationship between job stressors and health, especially for an effect of sustained poor – or deteriorating – working conditions.

Taken together, these findings provide strong supporting evidence for growing efforts nationally and internationally to address the upstream determinants of job stress (psychosocial working conditions) as well as its downstream health and other consequences.

Economic benefits of reducing job stress

Using the estimates for job strain-attributable depression described above (LaMontagne et al., 2008), we recently estimated the economic benefits of reducing or eliminating job strain-attributable depression (LaMontagne, Sanderson et al., 2010). The approach used was to quantify the financial benefits of eliminating job strain as a risk factor for depression using epidemiologic and economic modelling.

The specific aims were to:

- estimate the costs in the Australian workforce for job strain-attributable depression versus all other depression, as an indication of the potential economic benefit if job strain-attributable depression could be reduced or eliminated
- estimate the costs from three perspectives: societal, employer and individual, where individual costs are approximated from costs for employees who do not have paid sick leave.

Societal cost of lifetime depression in the Australian workforce (all depression, regardless of cause) was estimated at \$12.6 billion over one year and \$213.5 billion over a lifetime (LaMontagne, Sanderson et al., 2010). The vast majority of these costs related to employment (lost productive time and job turnover). The societal cost of depression in employed Australians that is attributable to job strain was estimated at \$730 million over one year and \$11.8 billion over a lifetime (LaMontagne, Sanderson et al., 2010). This provides an upper bound for the potential economic benefits if job strain could be reduced at a population level. These estimates offer an economic incentive for governments and employers to expand

efforts to implement job stress prevention and control, complementing and extending OHS regulatory mandates to provide safe working conditions.

Employees without access to paid sick leave are an important component of the Australian labour market (approximately 25 per cent of working Australians have no paid annual or sick leave) (ABS, 2007). We estimated that absenteeism costs for employees with depression who do not get paid for sickness absence incur a total of \$85 million over one year. This is a substantial cost borne by these individuals and may have the consequence of promoting attendance at work when unwell (presenteeism). While this is an important subgroup to consider, this analysis suggests that the vast majority of employment-related costs from depression in the workforce are borne by employers. This reinforces previous studies demonstrating that employers are already paying a high cost for depression in their workforce. It also provides a clear business incentive for employers to invest in initiatives that reduce job stress, promote mental health and encourage help-seeking, as the return on investment is potentially in the tens of millions of dollars. Employees would benefit through reduced job stress and improved mental and physical health.

5. Population groups most at risk

Until recently, most job stress intervention targeting by OHS regulators and other workplace stakeholders was based on stress-related workers' compensation claims statistics. We have complemented this with epidemiologic research to provide a claims-independent estimate of the size of the stress-related disease burden and compared patterns of exposures to job stressors with patterns of stress-related claims. While workers' compensation claims are and will likely remain a key policy and practice driver for OHS regulators, workers' compensation authorities, insurers and business, a number of shortcomings of this approach were elucidated by this comparative epidemiologic research, highlighting a need for epidemiologic data to complement claims statistics in policy and practice development.

Workers' compensation claims overall are decreasing over time on a national level. Claims for 'mental stress' at a national level, however, increased by 83 per cent from 1996–97 to 2003–04 (ASCC, 2007a). By contrast, hardly any work-related CVD is compensated (ASCC, 2007a). Compensated 'psychological injury', 'mental stress' and other stress-related claims, despite their rise in Australia in recent years, are suspected to represent only a small fraction of job stress-related adverse health outcomes (Russell & Roach, 2002; Steven & Shanahan, 2002). This question was explored empirically by comparing job strain-attributable depression estimates to numbers of 'mental stress' claims (LaMontagne et al., 2008).

The job strain-attributable depression percentages described previously in this report were applied to the absolute number of 12 month prevalent depression cases among working Victorians using data from the 1997 Australian National Mental Health Survey (ABS, 1998). This yielded an estimated total of 21,437 job strain-attributable cases of depression (LaMontagne et al., 2008). The former National Occupational Health and Safety Commission's (NOHSC) publicly accessible workers' compensation (WC) statistics database was queried for Victorian job stress claims for the same year as the exposure estimates (2003), with stress-relatedness identified by a "mechanism of injury or disease classification" of 'mental stress' (ASCC, 2007a). A total of 1,723 Victorian 'mental stress' WC claims were reported for 2003. The nature of these claims was investigated in a Commonwealth government analysis of 'mental stress' claims nationally from 2004–05 (ASCC, 2007b).

This analysis identified the most common sub-category of 'mental stress' claims as involving "work pressure" (41 per cent of total), defined as disorders arising from work responsibilities and workloads, workplace interpersonal conflicts and performance and promotion issues (ASCC, 2007a). This was followed by harassment (22 per cent) and violence (16 per cent). Accordingly, we would expect approximately 41 per cent of 'mental stress' claims to be related to chronic stressors such as job strain, yielding an estimate of 696 compensated claims. There is an approximately 30-fold difference between these two estimates (696 compensated versus 21,437 estimated), demonstrating that chronic job stress

claims are dwarfed by job strain-attributable depression (LaMontagne et al., 2008). This shows that claims statistics substantially underestimate job stress-attributable mental disorders and therefore do not provide an adequate basis for targeting preventive interventions.

In another study aiming to identify priority work groups and settings for job stress intervention, Victorian job strain exposure prevalence data was analysed to identify those work groups and contexts showing the highest prevalence of job strain. These findings were then compared to 'mental stress' claims patterns to gauge the extent to which workers' compensation data can be used to identify the highest priorities for intervention (Keegel et al., 2009). There were some areas of concordance between patterns of job strain and stress-related workers' compensation claims. For example, both job strain and claims rates were higher among females and both were highest in the health and community services sector. But there were also important discrepancies.

Job strain is most prevalent among younger workers in low status occupations, but claims rates are highest among middle-aged workers in higher status occupations. The sector with the highest prevalence of job strain for both males and females was accommodation, cafés and restaurants; WC stress claims from this sector, however, were not elevated. This demonstrates that workers' compensation insurance statistics – the primary drivers for most intervention efforts to date – are inadequate for the purpose of identifying priorities for job stress intervention on a population level. Workers' compensation statistics under-represent highly exposed groups in lower socioeconomic positions. These findings offer a public health evidence-based complement to WC statistics for guiding policy and practice in this area.

In another analysis of Victorian job stressor data, psychosocial working conditions under various employment arrangements were comparatively assessed (LaMontagne, Smith, Louie, Quinlan, Ostry & Shoveller, in press). Casual full-time workers had the worst exposure profile, showing the lowest job control and highest job pressure, as well as the highest odds of multiple job holding, shift work and exposure to four or more additional occupational hazards. In a related analysis, precariously employed women were shown to be at greatly elevated risk of unwanted sexual advances at work compared to women employed in permanent full-time jobs (LaMontagne et al., 2009).

The studies described previously establish the need to focus on lower skill level, or lower occupational status, workers on the basis of *differential exposure* (i.e. that they are more likely to be exposed than higher skill level groups) (LaMontagne, Keegel et al., 2010). This is compounded by growing evidence that lower status workers are also *differentially susceptible* to job stress-related ill health (LaMontagne, Keegel et al., 2010). That is, given the same level of exposure to stressors, there are greater adverse impacts on health for lower status groups. Differential susceptibility likely occurs because those in lower socioeconomic positions have fewer social and material resources to help them withstand work pressures. This was shown empirically in recent studies for both physical and mental health outcomes.

Landsbergis et al. (2003) showed that the effect of job strain on ambulatory blood pressure is greater among a sample of US working males in lower socioeconomic positions compared to higher positions. In a population-based study of German workers aged 45–74, the strongest associations between stressor exposures and both mental and physical health outcomes were consistently observed for lower socioeconomic position workers (Dragano et al., 2008; Wege et al., 2008).

6. Best practice workplace interventions and strategies at organisational and systems levels

- **The major characteristics and components of interventions and strategies, the specific indicators used and outcomes achieved for participants as well as the social/economic cost/benefit of the intervention.**
- **Key principles to guide intervention in workplace settings to reduce workplace stress.**

Job stress can be prevented and controlled effectively using a systems approach that integrates *primary*, *secondary* and *tertiary intervention* (LaMontagne et al., 2007b).

In brief, *primary preventive interventions are proactive*, aiming to prevent the occurrence of illness among healthy individuals. These address sources of stress in the workplace, or stressors, through alterations in the physical or psychosocial work environment, or through organisational changes (Landsbergis, 2003a). Examples include changes in work pacing and job redesign and the formation of joint labour/management health and safety committees. Primary preventive interventions may also be referred to as ‘stress prevention’ (Hurrell & Murphy, 1996; Jordan et al., 2003).

Secondary interventions are ameliorative, aiming to modify an individual’s response to stressors, targeting the individual with the underlying assumption that focusing on individuals’ responses to stressors should be done in addition to – or in preference to – removing or reducing stressors. Examples of secondary prevention interventions include stress management classes to help employees to either modify or control their appraisal of stressful situations, such as the development of muscle relaxation or meditation skills.

Finally, *tertiary interventions are reactive*, aiming to minimise the effects of stress-related problems once they have occurred, through ‘treatment’ or management of symptoms or disease. These include efforts to help employees to cope more effectively with reactions to stressful conditions, counselling (such as employee assistance programs) and return-to-work and other rehabilitation programs. ‘Stress management’ generally refers to secondary and tertiary interventions (Hurrell & Murphy, 1996; Jordan et al., 2003).

The development and implementation of job stress interventions must include the meaningful *participation* of groups targeted by intervention (Hurrell & Murphy, 1996; Israel et al., 1996). Participation is a particularly important principle in job stress intervention because it is integral to the prevention and control of job stress itself. Participation is a concrete enactment of job control, demonstrates organisational fairness and justice, and builds mutual support among workers and between workers and supervisors (recall these constructs from the previous section on job stress and its health impacts). These and other aspects of participation constitute primary preventive interventions in the job stress process.

Participation is also a key principle in public health and health promotion more generally. For example, a fundamental premise of public health – and the ‘new public health’ in particular – is that in addressing public health problems, the participation of those most affected in the formulation and implementation of responses is essential (Baum, 2002). This principle is also specifically incorporated into the WHO’s Ottawa Charter on health promotion (Noblet & Murphy, 1995) as well as other workplace health-specific charters and declarations, including the first WHO Healthy Workplace Guidelines (WHO, 1999) and the European Network for Workplace Health Promotion’s Luxembourg Declaration (ENWHP, 1997).

Participation helps to optimise the fit of the intervention to the context at hand and provides a means for integrating the participants’ context expertise with the content expertise of OHS or other professionals involved in the intervention. This is crucial because organisations usually require unique solutions to job stress problems, even if the process of intervention may be based on generic principles and frameworks (Hurrell & Murphy, 1996). More traditional and complementary means of tailoring an intervention to context include needs assessment or risk assessment (described further below). In Europe, the term ‘social dialogue’ is used, referring to the need for consultation with key workplace stakeholders and employee participation in reducing psychosocial risk (Leka & Cox, 2008b).

Table 2 (see end of document) presents examples of specific intervention activities corresponding to primary, secondary and tertiary intervention. An expanded articulation of a comprehensive or systems approach to the prevention and control of job stress is provided elsewhere (LaMontagne et al., 2007b). These specific activities outlined in Table 2 also provide examples of particular intervention process indicators.

Well-developed sets of indicators of psychosocial risk that can be used for needs assessment and evaluation are available from international sources. A more detailed list of indicators, based on similar systems approach principles to those described above, is available in a recent European framework for psychosocial risk management referred to as PRIMA-EF (detailed further below). This list groups indicators into organisational factors (e.g. OHS policies, collective agreements), work- or job-related factors (e.g. job demands, job control), outcomes (e.g. mental health, job satisfaction) and preventive actions/interventions (e.g. risk assessment, intervention activities at the primary, secondary and tertiary levels – similar to those described in Table 2).

See pages 18–19 at <http://prima-ef.org/guide.aspx> (Leka & Cox, 2008b) and a self-contained factsheet version at <http://prima-ef.org/Documents/08.pdf>. Another useful open access source of indicators is the Copenhagen Psychosocial Questionnaire, or COPSQ (see <http://www.arbejdsmiljoforskning.dk/en>) (Kristensen et al., 2005).

COPSOQ is available in three versions:

1. long version for research use (141 questions, 30 scales)
2. medium size version for work environment professionals (95 questions, 26 scales)
3. short version for workplace use (44 questions, eight scales).

The consolidation of the evidence base around best practice for job stress and other workplace interventions has been the subject of considerable attention in Europe and the UK, as well as at the WHO. Recognising the need for an integrated approach to workplace psychosocial risk management across the member states of the European Union, a major project was undertaken to develop the European Psychosocial Risk Management-Excellence Framework (PRIMA-EF). PRIMA-EF is aimed to provide a comprehensive best practice framework for psychosocial risk management in the workplace to a range of stakeholders including policy-makers, employers, trade unions, OHS professionals and employees (Leka & Cox, 2008a). In particular, the project was aimed at providing a framework for policy and practice at national and enterprise/organisational level within the European Union. PRIMA-EF is part of the World Health Organization's recently articulated Healthy Workplaces Framework (WHO, 2010).

In a series of interviews and focus groups conducted by the PRIMA-EF project, features of successful workplace intervention projects were identified. The experts interviewed for the project emphasised seven key features in relation to the design of the intervention, implementation in the workplace and content (Leka et al., 2008):

1. Workplace interventions need to be developed with a full understanding of theory and evidence-based practice.
2. A systematic and step-wise approach needs to be utilised with development of clear aims, goals, tasks and intervention planning.
3. A proper risk assessment needs to be carried out with the aim of identifying risk factors and groups of workers with potentially high exposure.
4. The interventions need to be tailored to suit a given industrial sector, occupation or workplace size but also remain flexible and adaptable for implementation in a specific workplace.
5. The most effective interventions are those which are accessible and user-friendly in their format, process and content to individuals at all levels of an organisation (from lowest status workers to highest level managers).
6. A systematic approach was highlighted as the most effective with components of the intervention aimed at both the individual and the organisation.

7. Intervention programs which facilitate competency building and skill development are important as at the organisational level they build leadership and management skills “which facilitate and support the continuous improvement cycle and support organisational change and at the individual level, individuals are enabled to identify and manage work-related stress. Successful workplace-based projects were characterised by a decreasing need for interventions to be expert driven and facilitated” (Leka et al., 2008).

Tools and resources that would be useful in implementing best practice approaches to reducing workplace stress

The seven key features of successful workplace interventions outlined previously provide a useful organising framework for best practice tools and resources for workplace stress intervention.

1. Workplace interventions need to be developed with a full understanding of theory and evidence-based practice:
 - This level of justification and planning is reasonable to expect of policy-makers (e.g. OHS regulators, other branches of government) and perhaps some other workplace stakeholders (e.g. large employers, trade union federations, employer associations). However, relying on authoritative summaries and interpretations of this vast body of evidence is more feasible for smaller organisations and groups. This document and its book length predecessor (LaMontagne et al., 2006) provide examples of effort to translate the theory and findings of this research and to make it accessible to and usable by workplace stakeholders.
 - The evidence base for best practice psychosocial risk management in general and job stress intervention in particular was reviewed in the PRIMA-EF project (the European Psychosocial Risk Management-Excellence Framework) and is accessible online in book length (see <http://prima-ef.org/book.aspx> (Leka & Cox, 2008a)) and in specific chapter form (see <http://prima-ef.org/Documents/chapter%208.pdf> (Leka et al., 2008)), respectively.
 - The UK Health and Safety Executive Management Standards (for addressing workplace psychosocial risks, see <http://www.hse.gov.uk/stress/index.htm>) and the US Job Stress Network (see <http://www.workhealth.org/index.html>) websites are two other recommended evidence summary resources.

2. A systematic and step-wise approach needs to be utilised with development of clear aims, goals, tasks and intervention planning:
- Guidance on workplace intervention planning is available from a number of sources. LaMontagne and Shaw (2004) prepared a hands-on guide for WorkSafe Victoria that is accessible at http://www.mccaugheycentre.unimelb.edu.au/_data/assets/pdf_file/0009/149994/Workcover_ohs_evaluation_frwk.pdf. This guide includes a process for articulating the rationale or logic of a given intervention, compelling the user to be clear about intervention goals and objectives as well as how goals and objectives can be achieved through the intervention activities. The user is asked to articulate who or what the intervention hopes to change, how the different intervention activities map onto those hoped for changes and over what time period such changes could or should be achievable.
 - Some generic workplace intervention planning guidance is provided in the WHO's recent *Healthy Workplaces* document (WHO, 2010). For example, an eight step 'continual improvement' cycle is described.
 - More specifically relevant to job stress intervention, the PRIMA-EF approach articulates a five step process of psychosocial risk management at the enterprise or organisational level (see <http://prima-ef.org/Documents/02.pdf>):
 1. declaring a focus on a defined work population, workplace or set of operations
 2. assessment of risks to understand the nature of the problem and their underlying causes
 3. design and implementation of actions intended to remove or reduce the risks
 4. evaluation of those actions and learning from them
 5. active and careful management of the process
 - PRIMA-EF also provides more specific guidance on intervention development and planning, including the 'development of an action plan', see chapter 4 at <http://prima-ef.org/guide.aspx> (Leka & Cox, 2008b).
 - The US Centers for Disease Control and Prevention *Work-Life Initiative* offers a range of recently published open access resources (<http://www.cdc.gov/niosh/worklife/>), including:
 - toolkit for protecting and promoting worker health: <http://www.cdc.gov/workplacehealthpromotion/model/index.html>
 - essential elements of effective workplace programs and policies for improving worker health and wellbeing: <http://www.cdc.gov/niosh/TWH/>

3. A proper risk assessment needs to be carried out with the aim of identifying risk factors and groups of workers with potentially high exposure:
- Risk assessment can be simply defined as identifying and assessing health and safety risks that can arise in a given work situation. This sets the stage for devising interventions to deal with the identified risks. Put another way, risk assessment provides the ‘needs assessment’ or ‘problem diagnosis’ required to devise an appropriate intervention. The European Commission (EC) provides a valuable formal definition of risk assessment as: *a systematic examination of the work undertaken to consider what could cause injury or harm, whether the hazards could be eliminated and if not what preventive or protective measures are, or should be, in place to control the risks* (see <http://prima-ef.org/Documents/02.pdf>).
 - It is crucial that employees and their representatives (e.g. elected OHS representatives, trade union reps) participate in risk assessment. This can take the form of walk-through workplace inspections, groups discussions and/or confidential employee surveys.
 - It is crucial that the risk assessment focuses on work, not on individuals. The goal of psychosocial risk assessment for the employer is to fulfil its mandated responsibility to identify, assess and control those aspects *of work* that pose risks to psychosocial health (i.e. to control those things that employers can reasonably control).
 - One of the challenges of risk assessment for workplace stress is that generic concepts such as job control manifest differently by industrial sector, occupational skill level, gender, age, employment arrangement and other factors. Put differently, job control looks very different for a convenience store checkout clerk than it does for a nurse or human resources (HR) manager. Thus risk assessment guidance needs to strike a balance between providing generically applicable advice and providing adequate detail to support the user in this endeavour.
 - The European PRIMA-EF website provides guidance on psychosocial risk management, see pages 9–11 at <http://prima-ef.org/guide.aspx>. A more concise version of psychosocial risk assessment is provided as part of a two page PRIMA-EF factsheet at <http://prima-ef.org/Documents/02.pdf>
 - State and Territory OHS authorities have published job stress guidance materials that include risk assessment guidance. See, for example, a recent June 2010 WorkCover Tasmania publication (based in part on previous work from the Queensland Department of Justice and Attorney General) entitled *Workplace Stress: A guide for employers and workers* at http://www.wst.tas.gov.au/_data/assets/pdf_file/0020/146252/GB252.pdf

4. The interventions need to be tailored to suit a given industrial sector, occupation or workplace size, but also remain flexible and adaptable for implementation in a specific workplace.
5. The most effective interventions are those which are accessible and user-friendly in their format, process and content to individuals at all levels of an organisation (from lowest status workers to highest level managers):
 - Resources to support workplace efforts on these two valuable points are covered by those listed under points 1–3 previously.
 - Employee participation is also crucial to meeting these criteria of best practice. There are a number of participatory methods for developing and implementing job stress and other workplace health interventions. See for examples, an Australian application of the Future Inquiry method (Blewett & Shaw, 2008) and a method developed in Germany called “Health Circles” (Aust & Ducki, 2004).
6. A systematic approach was highlighted as the most effective with components of the intervention aimed at both the individual and the organisation:
 - This finding and the language used to express it was supported in the PRIMA-EF guidance in part by the findings of our 2007 systematic review (LaMontagne et al., 2007a). Guidance on implementing a systems approach was outlined previously (LaMontagne et al., 2007b; LaMontagne et al., 2006).
 - A brief factsheet version of the PRIMA-EF recommendations on best practice in work-related stress management interventions is available at <http://prima-ef.org/Documents/09.pdf>
 - The PRIMA-EF website also has a number of European examples of best practice workplace intervention projects (see <http://prima-ef.org/inventory.aspx>). This inventory allows the user to search “interventions for work-related stress” by level of intervention (primary/secondary/tertiary) and by country. It also provides a similar (but smaller) inventory of “interventions for violence, bullying and harassment”. The selection criteria for these ‘best practice interventions’ are detailed as well (see <http://prima-ef.org/sc.aspx>). The detailed examples of ‘best practice’ represent a mix of specific projects and methods for conducting job stress risk assessment and management (i.e. integrated process of intervention needs assessment, development and intervention).
 - Other recommended sources include State and Territory OHS authority guidance, such as the Tasmanian WorkCover authority document detailed above and a recent document published by WorkSafe Victoria (WorkSafe Victoria, 2009).

7. Intervention programs which facilitate competency building and skill development are important as, at the organisational level, they build leadership and management skills which assist and support the continuous improvement cycle and support organisational change. At the individual level, individuals are enabled to identify and manage work-related stress. Successful workplace-based projects were characterised by a decreasing need for interventions to be expert driven and facilitated:

- Competency and skills development for employees at all occupational levels in an organisation is essential to a systems approach. Such skills are relevant to primary (e.g. a manager learning how to re-organise jobs to improve employee autonomy or job control), secondary (e.g. a worker improving his or her time management and coping skills) and tertiary intervention (e.g. an HR manager learning how to keep up to date with the latest evidence-based practice to optimise assistance for workers returning to work from job stress-related depression). Lower skilled employees should receive extra consideration for primary prevention as they are more likely to be exposed to job strain and other poor working conditions than higher skilled workers. Participatory approaches are of particular importance for employees at lower occupational skill levels.
- The European PRIMA-EF website has a number of European examples of best practice workplace intervention projects (<http://prima-ef.org/default.aspx>).
- Employee Assistance Programs (EAPs) are widely prevalent and relevant to job stress intervention. While predominantly focusing on the individual level in current practice (LaMontagne et al., 2007b; 2006), these programs could address job stress at the organisational level as well (Azaroff et al., 2010). The International Employee Assistance Professionals Association states that EAPs help employers address productivity issues by both advising the leadership of organisations and helping “employee clients” in identifying and resolving a broad range of personal concerns that may affect job performance (IEAPA, 2010). A recent qualitative interview identified two salient barriers to organisational level interventions through EAPs: lack of access to company management and (for contracted EAPs) perceptions of contract vulnerability (Nobrega et al., 2010). Companies using EAPs could realise better value from this service by involving EAP providers in the development of organisational intervention strategies. EAPs would need to protect client confidentiality, but could still provide intervention “tailoring” advice based on organisation-specific experience. This represents one way to realise the feedback from the secondary/tertiary level to primary level intervention described above as a feature of a systems approach.

- A plain language book for middle to upper managers on improving employee wellbeing was published recently by two leading figures in the psychosocial risk management field: Jean-Pierre Brun and Cary Cooper (Brun & Cooper, 2009). Titled *Missing Pieces*, the book details “seven ways to improve employee wellbeing and organisational effectiveness”. These are:
 1. employee recognition
 2. employee support
 3. developing a culture of respect
 4. reconciling work with personal life
 5. controlling workloads
 6. encouraging and supporting autonomy and participation in decision-making
 7. clarifying roles.

While particularly relevant to promoting a positive psychosocial work environment, these simple principles extend to promoting a healthy and productive workplace more generally. Highly recommended for business leaders, managers and other workplace stakeholders.

Following is a three part case study outlining a workplace intervention strategy.

Box 1: case study part one (Noblet & LaMontagne, 2006)

The operator assisted services (OAS) unit of Opticom is a 24-hour call centre located in the central business district of a large Australian city. Approximately 200 employees are employed across three shifts to attend to local and international enquiries. Opticom appointed a new manager to the OAS unit who, in her first review of the unit’s operations, found that it was experiencing high absenteeism (most of which was sick leave), increasing customer complaints and low morale. Anecdotal evidence from a number of employees also suggested that stress levels were high. The manager was determined to reduce the high rates of sick leave and immediately sought the services of a corporate health promotion company. This company introduced a series of health checks and follow-up counselling covering such issues as diet, blood pressure, fitness and stress. In the case of stress, all staff were given the opportunity to attend relaxation classes twice a week. After six months, an evaluation of the program revealed that it had very little impact on absenteeism. While the screening sessions held during work hours were well-attended, the relaxation classes were not.

Box 2: case study part two (Noblet & LaMontagne, 2006)

There are many problems inherent within the OAS unit. The task of attending to public enquiries is extremely repetitive. In the domestic section, for instance, operators would receive an average of 175 calls per eight hour day, with each lasting between 30 seconds and five minutes. They often have to attend to irate and sometimes abusive callers and receive next to no training in dealing with this sort of conflict. There is a top-down style of management and operators have virtually no say in decisions directly affecting what they do, despite the fact that they are generally in the best position to identify problems and generate ideas for overcoming them. Exacerbating the situation is an unpredictable style of supervision that swings erratically from overbearing to nonexistent.

Box 3: case study part three (Noblet & LaMontagne, 2006)

After Opticom realised that its strategies had not worked, it decided to undertake a more inclusive and systematic investigation into why OAS was not performing as well as it should. A small committee, consisting of management and employee representatives, was formed to guide and oversee this assessment. The committee quickly found that the unit's performance fluctuated significantly and a period when error rates were particularly high was mid-afternoon on a weekday. Informal discussions with a cross-section of employees later found that a major source of poor performance was mothers worrying about whether their children had got home from school safely. OAS employed a large number of mothers with dependent children and action needed to be taken to address their needs. Through the ideas generated by employees, Opticom gave their operators a 10 minute break around 4 pm so they could call home to make sure that their children had arrived safely. This strategy alone resulted in a significant improvement in the service quality and morale. The timing of the relaxation classes was also changed to better accommodate the work and personal commitments of employees.

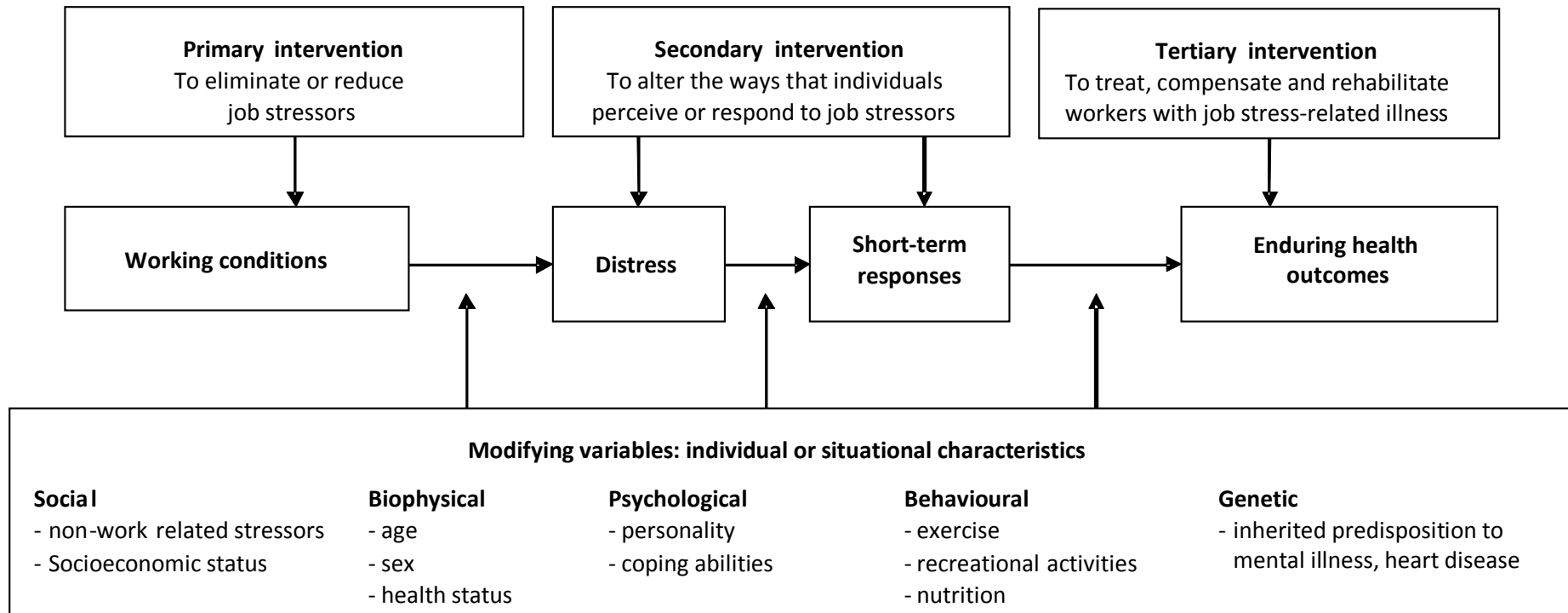
7. Conclusions

In summary, exposure to workplace stressors predicts serious adverse effects on mental and physical health, even after accounting for other established contributors. Given the widespread prevalence of job stress among working people, this translates to large preventable burdens of common chronic illness and disease. Job stress-related workers' compensation claims statistics substantially underestimate the burden of job stress-attributable common mental disorders, particularly among lower status workers. Job stress is a large and growing public health problem, warranting a commensurate public health response. Feasible and effective intervention strategies are available for addressing job stress in the workplace. The available evidence suggests that priority groups for intervention include younger workers, working women and workers in lower skilled occupations and precarious employment arrangements.

The substantial and inequitably distributed job stress-related disease burden could be addressed by applying a systems approach to job stressors and other psychosocial working conditions. In addition to being a concern for workers, unions, employers, occupational health and safety and workers' compensation systems, job stress should be a matter for physical and mental health promotion agencies, government public health authorities, medical practitioners, community advocacy groups and others. An optimal public health response to job stress would encompass participation by the full range of stakeholders.

8. Appendixes

Figure 1: Job stress process, modifying variables and intervention points



(LaMontagne et al., 2007b)

Table 1: Job stress and health: physical, mental and behavioural health outcomes linked to job stress

Job stress-related health outcome groups	Job stress-related specific health outcomes
Physical	<ul style="list-style-type: none"> • Cardiovascular disease (CVD) • Coronary heart disease (CHD) • Myocardial infarction (heart attack) • Hypertension • Diabetes • Metabolic syndrome
Mental	<ul style="list-style-type: none"> • Depression (including major depression, depressive symptoms, etc.) • Anxiety disorders (generalised anxiety disorder) • Various measures of distress (e.g. General Health Questionnaire) • Burnout • Suicide • Various measures of poor mental health (e.g. Short Forms 12 & 36, Psychiatric Symptoms Index)
Behavioural	<ul style="list-style-type: none"> • Smoking • Alcohol consumption • Alcohol dependence • Physical activity • Poor diet • Overweight and obesity

Table 2: A systems approach to job stress

Relative effectiveness	Intervention level	Occupational health and safety: hierarchy of controls	Psychology and related disciplines	Examples of intervention objectives and corresponding activities	
				Objectives	Activities
<p style="text-align: center;">MOST</p> <p style="text-align: center;">▲</p> <p style="text-align: center;">▼</p> <p style="text-align: center;">LEAST</p>	<p>PRIMARY</p> <p>GOAL: To eliminate or reduce job stressors (eliminate or reduce risk factors for job stress)</p>	<p>Control at the source of the hazard or interception of the hazard in its path from source to worker through:</p> <ul style="list-style-type: none"> - hazard elimination - substitution with safer technology - process isolation to contain exposure - engineering controls to reduce exposure 	<p>Organisational psychology: address stressors at the level of the organisation, or work-directed intervention</p>	<p>Reduce job demands</p> <p>Improve job control</p> <p>Improve social support</p>	<p>Increase time or other resource allocations to complete specific tasks</p> <p>Redesign the physical work environment to reduce musculoskeletal load and noise</p> <p>Provide breaks from client-based work</p> <p>Increase worker participation in work planning and decision-making</p> <p>Assess and integrate employee needs into planning of work schedules</p> <p>Assess and integrate employee needs to optimise supervisory social support</p> <p>Create clear promotion pathways</p>
	<p>SECONDARY</p> <p>GOAL: To alter the ways that individuals perceive or respond to stressors</p>	<p>Control at the worker level through:</p> <ul style="list-style-type: none"> - administrative controls (e.g. job rotation) - training and education - personal protective equipment - health surveillance 	<p>Psychology: organisation-directed interventions, particularly around the organisation-individual interface and individual-directed interventions</p>	<p>Alter individual responses to job stressors</p> <p>Improve individual ability to cope with short-term stress responses</p> <p>Detect stress-related symptoms and intervene early</p>	<p>Provide cognitive behavioural therapy or relaxation response training</p> <p>Provide anger management training</p> <p>Conduct health screening for stress symptoms, ambulatory blood pressure, hypertension, etc. – assess results on work group level</p>
	<p>TERTIARY</p> <p>GOAL: To treat, compensate and rehabilitate workers with job stress-related illness</p>	<p>Control at the level of illness, through:</p> <ul style="list-style-type: none"> - treatment - workers' compensation - rehabilitation and return to work programs 	<p>Psychology, psychiatry: counselling and psychotherapy</p>	<p>Treat job stress-related illness</p> <p>Compensate job stress-related illness</p> <p>Rehabilitate job stress affected workers</p>	<p>Medical care, counselling and employee assistance programs</p> <p>Reduce adversarial aspects of compensation process</p> <p>Include modification of job stressors in return-to-work plans</p>

(LaMontagne et al., 2007b)

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